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10/761,884

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Eric R. Schott

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DOAN, DUC T

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/761,884 | Applicant(s) SCHOTT, ERIC R. | |
| | Examiner DUC T. DOAN | Art Unit 2188 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,8-13 and 18-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,8-13 and 18-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/10/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/10/2009 has been entered.

Status of Claims

Claims 1-31 have been presented for examination in this application. Claims 4-7, 14-17, and 21 have been canceled. As the result, claims 1-3, 8-13, 18-20, and 22-31 are pending in this application.

Claims 1-3, 8-13, 18-20, and 22-31 are rejected

The applicant's remarks and amendments filed 2/10/2009 has been considered with the results as follows,

Information Disclosure Statement

The Information Disclosure Statements received 2/10/2009 has been considered. See attached PTO-1449(s).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

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matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 8-13, 18 and 22-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dimitri (US Pat. 6839802) in view of Jacobson et al (US Pat. 5392244) and in further view of The PC Guide (The Pc Guide's Multiple (Nested) RAID levels, 2001, herein Pc Guide).

As in claim 1, Dimitri discloses a system for providing differentiated classes of storage, comprising a storage device having a plurality of storage locations and a logical block name space for organizing logical block names of the storage locations (Fig 3, storage device, 20a to 20m, logical block name space with LBA as shown in Fig 1, col. 1 lines 9-42), a performance process configured to determine a level of performance for the plurality of storage locations (Fig 4, logic for determine level of performance for storage locations) and partition the plurality of storage locations into a plurality of regions as determined by their different levels of performance (Fig 4, partition into zones), and a mapping process configured to map the partitioned regions of the storage locations and aggregating the logical block names of the storage locations in the partitioned regions having an identical level of performance to a selected section of the logical block name space (Fig 4, mapping partitioned regions/zones to groups/sections of logical blocks having identical performance level, aggregating logical block names LBAs to RAID stripes/sections, col. 8 lines 31-43).

Dimitri does not expressly disclose the claim's aspect of configuring of the first RAID level. However, Jacobson discloses a RAID controller (Fig 1 14), for assigning a

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first RAID level configuration to a first set of aggregated logical block names (Fig 1 26 and 28). It would have been obvious to one of ordinary skill in the art at the time of invention to include the storage controller as suggested by Jacobson in Dimitri's system thereby data can be stored in different storage locations in according to a performance criteria/protocol and thereby further provide the storage system with high performance, high data availability and in an efficiently manner (col. 1 line 50 to col. 2 line 6). Dimitri and Jacobson do not expressly disclose the claim's aspect of the second RAID level configuration. However Pc Guide further discloses assigning a second RAID level configuration to a second set of aggregated logical block names, the first and the second RAID level configurations being different from each other (pages 1-2, two RAID levels to a set of disks). It would have been obvious to one of ordinary skill in the art at the time of invention to include the second RAID level as suggested by PC Guide in Dimitri's system modified by Jacobson and thereby further improve the performance for data of certain application (page 1); Pc Gide further discloses the system thereby providing differential classes of storage having two or more differentiated RAID level configurations to one or more clients accessing the system (page 1, providing different RAID levels configurations for different applications for different performance levels).

As in claim 2, Dimitri further discloses the performance process separates the plurality of storage locations into a plurality of categories as determined by their different levels of performance (Fig 4).

As in claim 3, Dimitri further discloses the different levels of performance represent different RAID levels of performance (Fig 3 and 4, col. 8 lines 31-43).

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As in claim 8, Dimitri further discloses a process configured to employ the storage to provide a file system service (col. 9 line 62 to col. 10 line 9).

As in claim 9, Dimitri further discloses a process configured to provide a storage volume service (col. 9 line 62 to col. 10 line 9, provide volumes in disks to store computer data/data in files).

As in claim 10, Dimitri further discloses the mapping process creates multiple storage volumes at a selected level of performance (col. 9 line 62 to col. 10 line 9, provide volumes in disks to store computer data for example data in files. Fig 3 and 4, col. 8 lines 31-43 grouping to volumes at a selected level of performance).

As in claim 11, Dimitri discloses a performance process for providing differentiated classes of storage, based on determined levels of a plurality of storage locations if a storage device, the process comprising the steps of providing a storage device having a plurality of storage locations and a logical block name space for organizing logical block names of the storage locations (Fig 4),

determining a level of performance of the plurality of storage locations (level of performance for storage locations are determined with values shown in Fig 4), partitioning the plurality of storage locations into a plurality of regions as determined by their different levels of performance (Fig 4, partitioning into zones), mapping partitioned regions of the storage locations (Fig 4, zones ready to be used to store data in volumes), and aggregating the logical block names of the storage locations in the partitioned regions having an identical level of performance to a selected section of the logical block name space (Fig 4, mapping partitioned regions/zones to groups/sections

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of logical blocks having identical performance level, aggregating logical block names LBAs to RAID stripes/sections, col. 8 lines 31-43),

Dimitri does not expressly disclose the claim's aspect of configuring of he first RAID level. However, Jacobson discloses assigning a first RAID level configuration to a first set of aggregated logical block names (Fig 1, controller 14 assign RAID level to data of 26 and 28). It would have been obvious to one of ordinary skill in the art at the time of invention to include the storage controller as suggested by Jacobson in Dimitri's system thereby data can be stored in different storage locations in according to a performance criteria/protocol and thereby further provide the storage system with high performance, high data availability and in an efficiently manner (col. 1 line 50 to col. 2 line 6). Dimitri and Jacobson do not expressly disclose the claim's aspect of the second RAID level configuration. However Pc Guide further discloses assigning a second RAID level configuration to a second set of aggregated logical block names, the first and the second RAID level configurations being different from each other (pages 1-2, two RAID levels to a set of disks). It would have been obvious to one of ordinary skill in the art at the time of invention to include the second RAID level as suggested by PC Guide in Dimitri's system modified by Jacobson and thereby further improve the performance for data of certain application (page 1); Pc Gide further discloses the storage device thereby providing differential classes of storage having two or more differentiated RAID level configurations to one or more clients accessing the system (page 1, providing different RAID levels configurations for different applications for different performance levels).

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Claim 12 is rejected based on the same reasons as of claim 2.

Claim 13 is rejected based on the same reasons as of claim 3.

Claim 18 is rejected based on the same reasons as of claim 10.

As in claim 22, Dimitri further discloses a level of performance includes a data access time, or a reliability of a storage location, or a combination thereof (Fig 3 and 4, zones with different data accessing time, storage locations with RAID providing different level of performance/reliability).

As in claim 23, Dimitri further discloses the storage device is a single storage disk (Fig 1, 2).

As in claims 24 Dimitri further discloses the mapping process performs mapping and aggregating when the storage system is designed (col. 9 lines 62 to col. 10 line 9, storage system is designed to map/store database applications' files to outer zones of disks)

As in claim 25, Dimitri further discloses the mapping process performs mapping and aggregating during operation of the storage device (col. 9 lines 10-15, migrating more frequently accessed files to outer zones of disks).

As in claim 26, Dimitri further discloses a performance measurement system for scanning storage locations of the storage device and determine the level of performance for the storage (Dimitri's Fig 4, scanning storage locations across the disk surface and measure the performance levels as shown in Fig 4).

As in claim 27, Dimitri further discloses the performance measurement system performs experimental read and write operations and determines the level of

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performance from experimental data collected in the read and write operations (Dimitri discloses the logic to measure performance levels/ utilization factor based on number of read and write operations to accessing files, collected during a measured time period; Based on the history of the this collected information, files are categorized accordingly, see Dimitri's col. 6 lines 7-10).

Claim 28 is rejected based on the same reasons as of claim 22.

Claim 29 is rejected based on the same reasons as of claim 27.

Claim 30 is rejected based on the same reasons as of claim 24.

Claim 31 is rejected based on the same reasons as of claim 25.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dimitri (US Pat. 6839802), Jacobson et al (US Pat. 5392244), The PC Guide (The Pc Guide's Multiple (Nested) RAID levels, 2001, herein Pc Guide) and Nguyen et al (US Pat. 6690523).

As in claim 19, Dimitri discloses a system for providing differentiated classes of storage, comprising a storage device having a plurality of storage locations, a logical block name space for organizing logical block names of the storage locations (Fig 3, storage device, 20a to 20m, logical block name space with LBA as shown in Fig 1, col. 1 lines 9-42), and performance parameters of the storage locations that vary across the storage device (different zones across the storage device having different performance parameters),

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a partitioning process configured to partition the storage locations into regions (partitions into zones) and aggregate the logical block names of the storage locations in the partitioned regions having an identical level of performance to a selected section of the logical block name space (Fig 4, mapping partitioned regions/zones to groups/sections of logical blocks having identical performance level, aggregating logical block names LBAs to RAID stripes/sections, col. 8 lines 31-43);

Dimitri does not expressly disclose the claim's aspect of configuring of he first RAID level. However, Jacobson discloses a RAID controller (Fig 1 14), for assigning a first RAID level configuration to a first set of aggregated logical block names (Fig 1 26 and 28). It would have been obvious to one of ordinary skill in the art at the time of invention to include the storage controller as suggested by Jacobson in Dimitri's system thereby data can be stored in different storage locations in according to a performance criteria/protocol and thereby further provide the storage system with high performance, high data availability and in an efficiently manner (col. 1 line 50 to col. 2 line 6). Dimitri and Jacobson do not expressly disclose the claim's aspect of the second RAID level configuration. However Pc Guide further discloses assigning a second RAID level configuration to a second set of aggregated logical block names, the first and the second RAID level configurations being different from each other (pages 1-2, two RAID levels to a set of disks). It would have been obvious to one of ordinary skill in the art at the time of invention to include the second RAID level as suggested by JPC Guide in Dimitri's system modified by Jacobson and thereby further improve the performance for data of certain application (page 1); Pc Gide further discloses thereby providing two or

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more differential classes of storage to one or more clients accessing the system (page 1, providing different RAID levels configurations for different applications for different performance levels).

Dimitri, Jacobson and Pc Giude do not expressly disclose the claim's aspect of a performance measurement system. However, Nguyen discloses a performance measurement system that scans storage locations of the storage device and determines the level of performance of the storage locations (col. 6 lines 15-40, calibration scan of the entire disk to recalibration each and every zones periodically). It would have been obvious to one of ordinary skill in the art at the time of invention to include calibration method as suggested by Nguyen in Dimitri's system modified by Jacobson and Pc Guide such that the different performances of each zones can dynamically be determined and thereby further optimize the performance of the system (Nguyen's col. 1 lines 22-41).

As in claim 20, Dimitri further discloses a system according to claim 19, wherein the partitioning process selects a fixed set of partitions as a function of a selected configuration of system components (Fig 3 selecting zones as a function of a selected configuration of system's files col. 6 lines 7 to 26).

Response to Arguments

Applicant's arguments in response to the last office action has been fully considered but they are not persuasive. Examiner respectfully traverses Applicant's arguments for the following reasons:

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A) Applicant's remarks at pages 7-10 overcomes the claim objection raised in the previous office action dated 8/8/2008.

B) Applicant's remarks at pages 10-13 have been fully considered but they are mooted in view of new ground(s) of rejection necessitated by the Applicant's amendments to the claims.

Conclusion

When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung S. Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Hyung S. Sough/
Supervisory Patent Examiner, Art Unit 2188
03/25/09